

REMARKS

Claims 1-68 are pending in this case. Claims 10, 5-7, 22-24, 39-41, 44 and 56-58 have been amended hereinabove. Based upon the following remarks, it is respectfully submitted that all claims are allowable.

A. Drawings

It was noticed that the image data was designated using “15b” in the text and “156” in original Figure 2. Figure 2 has been corrected also use “15b” to designate the image data.

B. Claim Objections

Claims 10 and 44 were cited as objectionable for an informality in the form of the recitation of “detector circuitry” instead of “detection circuitry”. This has been corrected by amendment hereinabove.

C. Claim Rejections - §112, ¶1

Claims 1-68 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. This rejection is respectfully traversed. It is submitted that, upon reading the present disclosure, the mutual interaction of the signals as cited by the Examiner from the claims is fully enabling to one of ordinary skill in the art who will immediately recognize from a knowledge of closed loop feedback control systems that such mutual interaction of signals is simultaneous. As evidence of the well known nature of this principle, submitted herewith is a copy of page 2 of the second edition of the classic textbook entitled “Modern Control Systems” by Richard C. Dorf, published in 1967, in which Figure 1-3 clearly illustrates and its accompanying text describes a classic closed loop feedback control system.

D. Claim Rejections - §112, ¶2

Claims 2, 5-7, 22-24, 39-41 and 56-58 were rejected under 35 U.S.C. §112, second

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paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. This rejection is respectfully traversed.

Regarding claim 2, it is submitted that its recitation of “at least one of intensity, focal spot and collimation” is definite. First, by parsing the recitation of “at least one of intensity, focal spot and collimation” it is seen that the phrase “at least one of” requires one or more of the set that includes “intensity, focal spot and collimation”. Hence, “at least one of intensity, focal spot and collimation” can comprise any of the following: intensity alone; focal spot alone; collimation alone; collimation and intensity; intensity and focal spot; collimation and focal spot; or collimation, intensity and focal spot. Second, while claim 1, from which claim 2 depends, recites that “said sub-portion is contained at least in part within said portion and does not consist of all of said portion”, it does not necessarily follow that the recited “one or more of a plurality of X-ray radiation characteristics” must include collimation. The recitation expressly states that the “sub-portion” is contained at least in part within the “portion”. In other words, the “sub-portion” may include area outside of the “portion”. Hence, with no more specific requirements regarding the characteristics of the “sub-portion”, it is not necessarily required that such “sub-portion” be defined by way of collimation.

Regarding claims 5-7, 22-24, 39-41 and 56-58, it is submitted that the original recitation of “said subject portion defines a target region” was definite. However, to make this more clear, these claims have been amended hereinabove to instead recite “said portion of said subject defines a target region”. It is respectfully submitted that since the recitation uses the phrase “said portion of said subject” as opposed to “said sub-portion of said subject” it is clear that such recitation refers to the “portion” and not the “sub-portion” recited in the corresponding independent claim. Accordingly, in the recitation of “said portion of said subject defines a target region”, the “target region” refers to the “portion” and not the “sub-portion”. (Notwithstanding this, it is further noted that in conformance with the recitation of “said sub-portion is contained at least in part within said portion and does not consist of all of said portion”, the “sub-portion” is contained at least in part within the “portion”).)

E. Claim Rejections - §102

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Claims 1-4, 8-10, 14-16, 18-21, 25-28, 31-33, 35-38, 42-44, 48-50, 52-55, 59-62 and 65-67 were rejected under 35 U.S.C. §102(b) as being anticipated by Ning, U.S. Pat. No. 6,480,565 ("*Ning*"). This rejection is respectfully traversed and it is submitted that these claims recite subject matter which is not anticipated by and is patentable over *Ning*.

Independent claims 1 and 35 include the following recitations (with emphasis added):

Claim 1

...; and

a control system, coupled to said X-ray emission and detection systems, responsive to at least said first image signal by providing said emission and detection control signals, wherein, in relation to a portion of said first image signal corresponding to said sub-portion of said subject, said second image signal differs from said first image signal in one or more of a plurality of image characteristics.

Claim 35

...; and

a control system, coupled to said X-ray emission and detection systems, responsive to at least said first plurality of image signals by providing said emission and detection control signals, wherein, in relation to a portion of said first plurality of image signals corresponding to said sub-portion of said subject, said second plurality of image signals differs from said first plurality of image signals in one or more of a plurality of multi-dimensional image characteristics.

Hence, in accordance with these express recitations (using the specific language from claim 1), the “emission and detection control signals”, in accordance with well known closed loop feedback control system principles, cause the “X-ray emission system” to provide “at least first and second doses of X-ray radiation, wherein [the] second dose differs from [the] first dose in one or more of a plurality of X-ray radiation characteristics” and the “X-ray detection system” to provide “corresponding first and second image signals, wherein [the] first and second image signals correspond to [the] portion and a sub-portion of [the] subject, respectively”. In other words, the first X-ray radiation dose causes the first image signal to be provided, which, in turn, causes emission and detection control signals to be provided, which, further in turn, cause the

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second image signal to be provided. As a result, the second image signal is a function of the first image signal in that the first image signal is required and used to determine the appropriate emission and detection control signals needed to cause the second image signal to be produced.

This is quite different from what is taught by *Ning*. In the areas of *Ning* cited by the Examiner in the Office Action, *Ning* discusses use of “scout images” and an “ultra-high-resolution volume-of-interest (VOI) reconstruction mode”, which the Examiner cites as corresponding to the presently recited “first and second image signals”. It is respectfully submitted that this is based on a misreading of *Ning*. First, as is best understood from *Ning*, the “scout images” are used simply for positioning and surveying patient body size (column 13, lines 37-39). Second, acquisition of meaningful image data would seem unlikely since a matrix of lead ball bearings is interposed between the X-ray source and patient (column 13, lines 41-43).

In any event, contrary to the cause-and-effect relationship between the presently recited “first and second image signals” as discussed hereinabove, the images produced according to the “VOI reconstruction mode” of *Ning* are not related to the “scout images”. As discussed in column 14, such images are produced in an entirely different manner and for an entirely different use than the “scout images”. Indeed, *Ning* expressly refers to the use of the “VOI reconstruction mode” as “another technique” (column 13, line 66; emphasis added), i.e., a technique distinct from and unrelated to that used for acquiring “scout images”.

The Examiner further cited column 14, lines 47-57, of *Ning* in which use of “3D segmentation” is discussed. It is not seen how such a technique produces the presently recited “first and second image signals” with the cause-and-effect relationship in response to the presently recited first and second doses of X-ray radiation as discussed hereinabove. As is best understood, use of “3D segmentation” relies on one set of image data, i.e., image data acquired using one dose of X-ray radiation, or alternatively multiple sets of data acquired using multiple unrelated doses of X-ray radiation. In other words, even if multiple doses of X-ray radiation are used to produce the image data to be used for the “3D segmentation”, such doses are unrelated in the sense that the characteristics of any particular dose are not dependent upon image data produced as a result of a prior dose.

These remarks are also applicable to and are, therefore, hereby incorporated by reference

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regarding independent claims 18 and 52 which include the following recitations (with emphasis added):

Claim 18

...; and

generating, in response to at least said processed first image signal, said emission and detection control signals, wherein, in relation to a portion of said first image signal corresponding to said sub-portion of said subject, said second image signal differs from said first image signal in one or more of a plurality of image characteristics.

Claim 52

...; and

generating, in response to at least said processed first plurality of image signals, said emission and detection control signals, wherein, in relation to a portion of said first plurality of image signals corresponding to said sub-portion of said subject, said second plurality of image signals differs from said first plurality of image signals in one or more of a plurality of multi-dimensional image characteristics.

F. Claim Rejections - §103/Ning/Shinno

Claims 5-7, 22-24, 39-41 and 56-58 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Ning* in view of *Shinno et al.*, U.S. Pat. No. 7,085,343 ("*Shinno*"). This rejection is respectfully traversed. In accordance with and with reference to the discussion in Part E hereinabove, it is submitted that claims 1, 18, 35 and 52 recite subject matter which is patentable over *Ning*. Therefore, it is still further submitted that their respective dependent claims 5-7, 22-24, 39-41 and 56-58 recite subject matter which is patentable over *Ning* and *Shinno* as well, particularly in view of these latter claims' further recited limitations.

G. Claim Rejections - §103/Ning/Nambu

Claims 17, 34, 51 and 68 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Ning* in view of *Nambu et al.*, U.S. Patent No. 6,196,715 ("*Nambu*"). This rejection is respectfully traversed. In accordance with and with reference to the discussion in Part E

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hereinabove, it is submitted that claims 1, 16, 18, 33, 35, 50, 52 and 67 recite subject matter which is patentable over *Ning*. Therefore, it is still further submitted that their respective dependent claims 17, 34, 51 and 68 recite subject matter which is patentable over *Ning* and *Nambu* as well, particularly in view of these latter claims' further recited limitations.

H. Claim Rejections - §103/*Ning*/*Giger*


Claims 11-13, 29-30, 45-47 and 63-64 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Ning* in view of *Giger et al.*, U.S. Patent No. 6,901,156 ("*Giger*"). This rejection is respectfully traversed. In accordance with and with reference to the discussion in Part E hereinabove, it is submitted that claims 1, 18, 28, 35, 52 and 62 recite subject matter which is patentable over *Ning*. Therefore, it is still further submitted that their respective dependent claims 11-13, 29-30, 45-47 and 63-64 recite subject matter which is patentable over *Ning* and *Giger* as well, particularly in view of these latter claims' further recited limitations.

I. Conclusion

Claims 1-68 remain pending in this case. Based upon the foregoing amendment and remarks, it is respectfully submitted that these claims are allowable, and reconsideration and early allowance of these claims are requested.

Respectfully submitted,

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